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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Alan James Coulson

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DANN, DORFMAN, HERRELL & SKILLMAN
1601 MARKET STREET
SUITE 2400
PHILADELPHIA, PA 19103-2307

EXAMINER

LEE, SIU M

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/550,633	Applicant(s) COULSON, ALAN JAMES	
	Examiner SIU M. LEE	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30-35 and 37-40 is/are allowed.
- 6) ☒ Claim(s) 41-43 and 45 is/are rejected.
- 7) ☒ Claim(s) 36, 44 and 46-49 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 30-49 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claim 36 is objected to because of the following informalities:

Claim 6 recite "A method reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in claim 6"; claim 6 has been cancelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (US 2001/0033625 A1, hereafter Ninomiya) in view of D'Luna et al. (US 2002/0106018 A1, hereafter D'Luna) and Hoffmann et al. (US 6,904,079 B2, hereafter Hoffmann).

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(1) Regarding claim 41:

Ninomiya et al. discloses a receiver comprising:

a front end arranged to receive data (terminate 1 to which a RF modulated wave is input, paragraph 0066);

a pilot fp signal extraction circuit (31 in figure 4) arranged to detect pilot symbols in the filtered data (pilot fp component is extracted by the pilot fp signal detection circuit 31, paragraph 0084); and

a logic system arranged to reroute the received data to a receiving apparatus when a pilot symbol has been detected (pilot component judging circuit 32 judges the presence of the a pilot component with the use of a threshold and generate a switching control signal based on the judgment, paragraph 0084, a pilot signal of a carrier wave is extracted and judged and based on a judgment of the pilot, either demodulation circuit 13 or 14 is being used for demodulation, abstract, figure 2, paragraph 0071);

the pilot signal has a length (it is inherent that a pilot signal would have a length).

Ninomiya fails to disclose (a) an adaptive filter arranged to filter narrowband interference from the received data and provide filtered data; (b) a correlator is being used for plot detection; and the pilot includes one or more repetitions of known data or pseudo noise sequence.

With respect to (a), in the same field of endeavor, D'Luna disclose in a cable environment, there exists a possibility of narrowband co-channel interference caused by inter-modulation products between channels, the in-band

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receiver may contain an adaptive filter 324 which places notches in the frequency spectrum at the location of these subcarriers, paragraph 0058.

It is desirable to have an adaptive filter arranged to filter narrowband interference from the received data and provide filtered data because it can remove the narrowband co-channel interference. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the adaptive filter as taught by D'Luna to reduce the interference and improve the performance of a receiver.

With respect to (b), Hoffmann discloses a correlator (access acquisition 60 in figure 3) arranged to detect pilot symbols in the data (the access acquisition function 60 is seen to include a pilot correlation filter 70 as well as an integration function 72, column 5, lines 58-67), and wherein the pilot symbol includes one or more repetitions of known data or pseudo noise sequence (each pilot block 53 consists of a number of repeated pilot symbol, column 5, lines 7-8).

It is desirable to have a correlator is being used for pilot detection; and the pilot includes one or more repetitions of known data or pseudo noise sequence because the correlation peak can be detected easily for synchronization. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Hoffmann in the system of Ninomiya and D'Luna for reliable pilot detection.

(2) Regarding claim 42:

D'Luna discloses an adaptive filter to place notches in the frequency spectrum at the location of narrowband interference but fails to disclose wherein

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a number of taps in the adaptive filter is greater than a maximum number of interferers to be cancelled.

However, it is obvious to one of ordinary skill in the art that in order for the adaptive filter to remove all the narrowband interference, the adaptive filter has to have a number of taps greater or equal to the number of narrowband interference to be notches, otherwise, the adaptive filter is unable to remove all the narrowband interference. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have the number of taps of an adaptive filter to be greater or equal to the number of narrowband interference to be removed.

5. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (US 2001/0033625 A1, hereafter Ninomiya) in view of D'Luna et al. (US 2002/0106018 A1, hereafter D'Luna) and Hoffmann et al. (US 6,904,079 B2, hereafter Hoffmann) as applied to claim 41 above, and further in view of Takada (US 2002/0196876 A1).

Ninomiya, D'Luna, and Hoffman disclose all subject matter as discussed in claim 41 except the adaptive filter uses a delayed stream of the received data as a reference signal.

However, Takada discloses an adaptive filter that uses a delayed stream of the received data as a reference signal (incoming signal $r(t)$ is being delayed but the delay device 41 as shown in figure 13, paragraph 0029).

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It is desirable to use a delayed stream of the received data as a reference signal because it provides benefit of efficient interference removal in case an interference signal superimposed on a desired signal (paragraph 0118).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Takada in the system of Ninomiya, D'Luna, and Hoffman to improve the efficiency of interference removal.

6. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (US 2001/0033625 A1, hereafter Ninomiya) in view of D'Luna et al. (US 2002/0106018 A1, hereafter D'Luna), Hoffmann et al. (US 6,904,079 B2, hereafter Hoffmann) and Takada (US 2002/0196876 A1) as applied to claim 43 above, and further in view of Roy (US 2004/0198452 A1).

Ninomiya, D'Luna, and Hoffman and Takada disclose all subject matter as discussed in claim 43 except a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol.

However, Roy discloses an adaptive filter comprises a tapped-delay line having taps spaced by a symbol period (paragraph 0023), it is obvious to one of ordinary skill in the art that a symbol period would be longer than a pilot period.

It is desirable to have a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol because it can removal interference in the whole data symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Roy in the system

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of Ninomiya, D'Luna, and Hoffman and Takada to improve the efficiency of interference removal.

7. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (US 2001/0033625 A1, hereafter Ninomiya) in view of D'Luna et al. (US 2002/0106018 A1, hereafter D'Luna) and Hoffmann et al. (US 6,904,079 B2, hereafter Hoffmann) as applied to claim 41 above, and further in view of Takahashi et al. (US 6,807,224 B1).

Ninomiya, D'Luna, and Hoffman disclose all subject matter as discussed in claim 41 except further comprising a matched filter correlator.

However, Takahashi et al. discloses a receiver have sliding correlator and matched filter for standby mode and initial synchronous mode (abstract, matched filter 209 and sliding correlator 210 in figure 5, column 4, lines 39-44).

It is desirable to further comprising a matched filter correlator current consumption can be reduced by using the matched filter occasionally (column 2, lines 32-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Takahashi et al. in the receiver of Ninomiya, D'Luna, and Hoffman to improve the power efficiency.

Allowable Subject Matter

8. Claims 30-35, 37-40 are allowed.

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9. Claims 36, 44, 46-49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

The present invention describes a method for reduction interference from at least one narrow band interferer in a pilot symbol assisted receiver comprising the steps of receiving a stream of received data, the stream of received data through an adaptive filter that reduces interference from any narrowband interferer, passing the filtered data through a correlator arranged to detect pilot symbols, when a pilot symbol is detected passing the stream of received data to a receiving apparatus without first passing the received data through the adaptive filter, and wherein the pilot symbol has a length and includes one or more repetitions of known data or pseudo noise. The closest prior art, Ninomiya et al. (US 2001/0033625 A1) in view of D'Luna et al. (US 2002/0106018 A1) and Hoffmann et al. (US 6,904,079 B2) discloses a similar system but fail to disclose when a pilot symbol is detected passing the stream of received data to a receiving apparatus without first passing the received data through the adaptive filter. This distinct feature has been added to the independent claims 30 and 37, thus rendering claims 30-40 allowable.

Conclusion

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11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Abdelmonem et al. (US 2002/0173341 A1) discloses a method and apparatus for increasing sensitivity in a communication system station comprising a bypass of an adaptive notch filter.

Ueda (US 5,787,118) discloses a receiver for selecting an adaptive equalizer or an adaptive diversity equalizer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/
Examiner, Art Unit 2611
11/9/2009

/CHIEH M FAN/
Supervisory Patent Examiner, Art Unit 2611